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or white and the non-medullated or gray nerve fibers. Contraction of involuntary muscle is brought about exclusively by impulses proceeding along the non-medullated nerves, while relaxation or inhibition of muscular contraction is as invariably produced by impulses conducted by the medullated nerves. All nerves in their course from the spinal cord to the sympathetic ganglia are of the medullated variety, but on leaving the sympathetic ganglia they are separable into two groups of medullated and non-medullated fibers; the medullated sympathetic fibers are, however, easily distinguished from those of ordinary striated muscle by their smaller diameter.

Dr. Gaskell writes: "In previous communications I have shown that the heart of various cold-blooded animals, *e. g.*, frog, tortoise, crocodile, is innervated by nerves coming from two distinct sources in the same way as the heart of the warm-blooded animal; and I am now enabled to make the further communication that in the dog, cat, rabbit, tortoise and crocodile these two sets of nerve fibers are structurally differentiated from each other in precisely the same manner. The vagus fibers from their origin up to their entrance into the heart are medullated, the sympathetic fibers in the whole of their course from the basal ganglia of the sympathetic along the annulus of Vieussens to the heart are non-medullated. \* \* \* Every involuntary muscle is innervated by two nerves which are histologically and physiologically distinct; the one gray, non-medullated, causing contraction of the muscle; the other white, fine, medullated, causing relaxation of the muscle."—*Jl. of Physiology*, Vol. vi, p. iv.

### ANTHROPOLOGY.<sup>1</sup>

THE AMERICAN ANTIQUARIAN.—This valued exchange has now become a bi-monthly. The anthropological papers of No. 5, Vol. VI, are:

Hindoo mythology. By F. G. Fleay.

Dates in the ancient history of S. America. By M. Castaing.

The hill tribes of India. John Avery.

Emblematic mounds. By S. D. Peet.

The paper of Mr. Avery is of great value, not only in naming and describing tribes, but in the explanation of certain customs. The article by the editor relates to the attitudes of the animals in the emblematic mounds, and supports the view that the constructors had in mind the various poses of the animals, which are familiar to hunters.

METALLURGY AMONG SAVAGES.—Dr. Richard Andree has just published in Leipzig a most interesting monograph with the following title: "Die Metalle bei den Naturvölkern mit berücksichtigung prähistorischer verhältnisse, mit 57 abbildungen im text.

<sup>1</sup> Edited by Professor OTIS T. MASON, National Museum, Washington, D. C.

Leipzig, Veit u. Comp., 1884," pp. 166. The topics treated are as follows:

- Iron and copper among the Negro races.
- Iron and copper in hither India.
- The Gypsies as metal workers.
- Metallurgy among the Malays, farther India, China, Japan, Northern Asia.
- Knowledge of iron among the American Indians.
- Copper in North America.
- Copper and bronze in Mexico.
- Metals used by the Chinchas.
- Copper and bronze in Peru.
- The spread of iron in the South Sea islands.

THE FRANKFURT CRANIOMETRIC AGREEMENT.—A full statement of this agreement has been published in the *NATURALIST*, and its importance is so great that we draw attention to Professor Garson's objections to it. In the first place, since those devoting themselves to any branch of science belong to one brotherhood, the introduction of the word German is unfortunate. In drawing up any code of craniometric measurements the researches of Broca must be the basis. Professor Garson advocates the condylo-alveolar plane. The audito-orbital plane is in some instances directed more or less obliquely downward; it is more difficult to place the skull in the latter plane; the apparatus of suspension is complicated and in the way of important measuring. Again, the horizontal measures are not important, the form of the skull is quite as fully indicated by measurements from fixed points by the sliding callipers. The following Frankfurt measurements are accepted, the numbers are those of the agreement:

- |                                 |                             |
|---------------------------------|-----------------------------|
| 2. Maximum length.              | 17a. Bi-jugal breadth.      |
| 4. Maximum breadth.             | 18. Bi-zygomatic breadth.   |
| 5. Maximum frontal breadth.     | 18a. Inter-orbital breadth. |
| 7. Height (basio-bregmatic).    | 21. Height of nose.         |
| 10. Basio-nasal length.         | 22. Breadth of nose.        |
| 12. Length } of foramen magnum. | 23. Orbital breadth.        |
| 13. Breadth }                   | 25. Orbital height.         |
| 14. Horizontal circumference.   | 30. Basio-alveolar length.  |
| 15. Fronto-occipital arc.       |                             |

The following measurements are rejected:

- |                                |   |
|--------------------------------|---|
| 1. Horizontal length.          | 17b. Infra-jugal facial breadth.        |
| 6. Total height.               | 24. Maximum horizontal orbital breadth. |
| 8. Ear height.                 | 26. Vertical height of orbits.          |
| 9. Auxiliary ear-height.       | 27. Palatal length.                     |
| 11. Basilar length.            | 28. Palatal breadth.                    |
| 13a. Bi-mastoid width.         | 29. Posterior palatine breadth.         |
| 13b. Breadth of base of skull. | 31. Profile angle.                      |
| 16. Transverse vertical arc.   |   |

REVUE D'ANTHROPOLOGIE.—Numbers I and II for 1882 contain the following papers :

Description élémentaire des circonvolutions cérébrales de l'Homme, d'après le cerveau schématique. By Paul Broca and S. Pozzi.

Le Transformisme. Cours d'Anthropologie Zoologique de l'Ecole d'Anthropologie. By Mathias Duval.

Etudes sur les Populations primitives. Les Cafres et plus spécialement les Zoulous. By M. Elie Reclus.

Le Poids du Cervelet, du Bulbe, de la Protuberance et des Hémisphères, d'après les registres de Broca. By Dr. Philippe Rey.

Etudes sur les Populations Primitives, etc. (fin.)

De l'Angle Zyphoïdien. By Adrien Charpy.

Etude sur les Kalmoucks (suite). By J. Denlar.

ETHNOGRAPHY OF GUATEMALA.—Dr. Otto Stoll, a resident physician in Guatemala, has undertaken to supplement the work of Brasseur and of Berendt on the comparative linguistics of the Central American States. There are eighteen languages now spoken in Guatemala, fourteen of them belonging to the Maya Qu'iché, viz., Maya, Mopan, Chol, Qu'ekchi, Pokonchi, Uspanteca, Ixil, Aquacateca, Mame, Qu'iché, Cakchiquel, Tzu'tuzil, Pokomam, Chorti. The Sinca, Pupuluca, Pipil and Carib represent other stocks. Dr. Stoll takes up his work in a very systematic manner, stock by stock, giving in each the tribes examined together with the literature, synonymy, chirography, history and vocabulary. Thus :

I. Aztek stock. The Pipils (Escuintla and Cuajiniquailapa).

Synonymy: Pipil (authors); Mejicano and Nahuatl (Juarros); Nahuatl of the Balsam coast and of Izalco (Squier); Mexicanic or language of the Tlaskaltekas (Scherzer).

II. Mije stock. The Populucas (Cognaco, extreme south-east).

Synonymy: Pupuluca (Juarros; Populuca (Palacio); Popoluca (Berendt MSS.).

Papuluka (Brasseur) is the name of a Cakchiquel village, and Scherz's Populuka Katschike is pure Cakchiquel.

III. Carib stock. The Caribs (Gulf of Honduras).

IV. The Maya-Qu'iché stock. 250 words in sixteen languages given.

Dr. Stoll divides the Maya into four groups :

A. Tzendal.

B. Pokonchi.

C. Qu'iché.

D. Mame.

A. Tzendal group. 1. Chontals of Tabasco.

Synonymy: Do not confound them with the "Chontales" of Nicaragua, who are entirely different.

2. Tzentaes (Ocosingo).

Synonymy: Celdal (Cepeda).

3. Tzotziles (San Christobal de Chiapas).

Synonymy: Cinacanteca (Cepeda); Zotzlem (Brasseur) or Zotzil; Que'enes (Spanish historians).

4. Chañabal (Comitan, near north of Guatemala).

5. Choles (across Guatemala from Salinas r. to Motagua r., see p. 90).



guages, in *Le Muséon*, Vol. III, 517-651; and Daniel G. Brinton publishes in the *Proc. Am. Phil. Soc.*, No. 115, pp. 345-412, a grammar of the Cakchiquel language of Guatemala.

### MICROSCOPY.<sup>1</sup>

MAYER'S CARBOLIC ACID SHELLAC.—Finding that clove oil and creosote produce fine granulations when used in the ordinary shellac method, Dr. Paul Mayer has adopted a new method of dissolving the shellac, by which an excellent fixative is obtained that never shows any traces of granulation. The fixative is applied by a fine brush to the *cold* slide.

Mayer prepares the solution in the following manner:

1. Dissolve one part of bleached shellac in five parts of absolute alcohol.

2. Filter the solution and evaporate the alcohol on a water-bath. A yellowish residue quite stiff when cold is thus obtained. If any cloudiness arises during evaporation, the solution must be filtered again.

3. Dissolve the shellac residue in pure carbollic acid on a water-bath. A concentrated solution of carbollic acid is obtained by exposing the crystals to the air until they dissolve, or by adding a small amount of water (about five per cent).

The quantity of acid should be sufficient to give a thickish liquid when cold.

This fixative is painted on to the cold slide with a brush, at the time of using. The sections are then placed, and the slide left in the oven of a water-bath for some minutes (10-15 minutes I find sufficient). The carbollic acid is thus evaporated, leaving a perfectly transparent stratum of shellac on the slide. The sections are next freed from paraffine in the ordinary way and mounted in balsam.

This method is considered to be the best and simplest for fixing *stained* sections.

The shellac can be dissolved directly in carbollic acid, but then the fluid must stand a long time in order to become clear, as it cannot be filtered. For this reason it is preferable to dissolve first in alcohol.

NOTE.—According to a note just received, Mayer now prepares the shellac as follows:

The shellac is pulverized and heated with crystals of colorless carbollic acid until it dissolves. In filtering the funnel should be heated over a flame. It will filter slowly but quite well. If it is too thick crystals of carbollic acid may be added until the desired consistency is reached.

AN ETHER FREEZING APPARATUS.<sup>2</sup>—A very simple and convenient little freezing apparatus, which can be used with almost any microtome, has recently been described by W. Emil Böcker.

<sup>1</sup> Edited by Dr. C. O. WHITMAN, *Mus. Comp. Zool.*, Cambridge, Mass.

<sup>2</sup> *Zeitschr. f. Instrumentenkunde*. Apr., 1884, pp. 126-127.